

CLAIMS

What is claimed is:

1. A method for supporting communication among a plurality of heterogeneous processing elements of a processing system, the method comprising:
 - forming an interconnection network to support services between any two processing nodes within a plurality of processing nodes;
 - utilizing a predefined data word format for communication among the plurality of processing nodes on the interconnection network, the predefined data word format indicating a desired service; and
 - arbitrating among communications in the network to ensure fair access to the network by each processing node.
2. The method of claim 1 wherein forming an interconnection network further comprises forming connections between each node in a grouping of nodes and between each of a plurality of groupings.
3. The method of claim 2 wherein the grouping of nodes further comprises a grouping of four nodes.
4. The method of claim 3 further comprising utilizing a matrix element as a processing node.

1 5. The method of claim 4 further comprising utilizing a RISC element as a
2 processing node.

1 6. The method of claim 1 wherein forming an interconnection network further
2 comprises forming a network of connections to support services in a point-to-point manner.

1 7. The method of claim 1 further comprising utilizing the interconnection network to
2 support services between a node and a host processor external to the plurality of processing
3 nodes.

1 8. The method of claim 7 wherein forming an interconnection network to support
2 services further comprises forming an interconnection network to support a host DMA
3 service, a node DMA service, a host read/write service, and a node read/write service.

1 9. The method of claim 1 wherein utilizing a predefined data word format further
2 comprises utilizing a data word format that includes a service field, a node field, a tag field,
3 and a data field.

1 10. The method of claim 9 wherein the data word format further comprises a 30-bit
2 data word.

1 11. The method of claim 1 wherein arbitrating further comprises transferring priority
2 of access to the interconnection network in a round-robin manner among the plurality of
3 processing nodes.

1 12. A system for supporting communication among a plurality of processing
2 elements, the system comprising
3 a plurality of heterogeneous processing nodes organized as a plurality of groupings;
4 an interconnection network for supporting data services within and among the
5 plurality of groupings as indicated by a data word sent from one processing node to another;
6 and
7 a plurality of arbiters for directing data word traffic on the interconnection network to
8 allow fair and efficient utilization of the interconnection network by the plurality of
9 heterogeneous processing nodes.

1 13. The method of claim 12 wherein each grouping in the plurality of groupings
2 further comprises four processing nodes.

1 14. The system of claim 12 wherein the plurality of arbiters provide arbitration
2 within and among each grouping in a token-based, round robin manner.

1 15. The system of claim 12 further comprising a matrix as a processing node type.

1 21. The method of claim 20 wherein each separate group further comprises four
2 nodes.

1 22. The method of claim 21 wherein the four nodes further comprise three matrix
2 elements and a RISC element.

1 23. The method of claim 20 further comprising arbitrating within and among the
2 separate groups of nodes for utilization of the set of wires.